

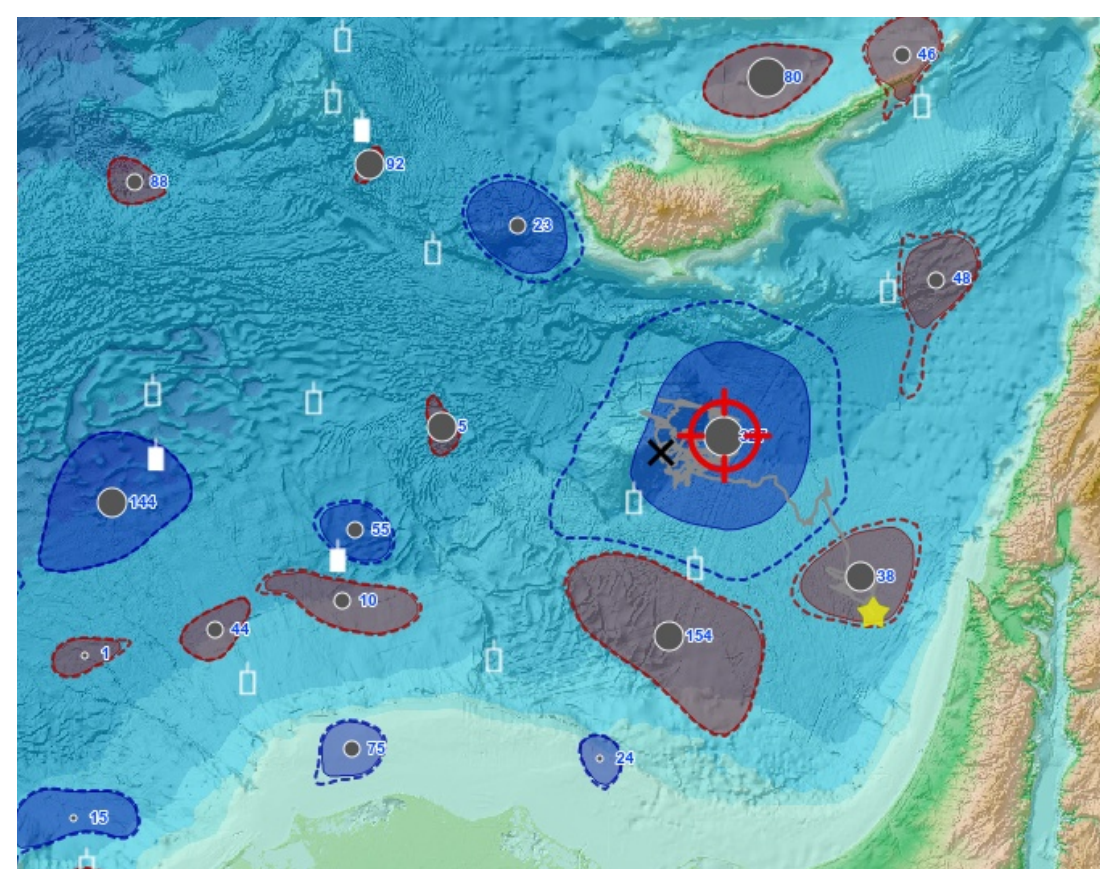
Lagrangian eddy tracking reveals the Eratosthenes anticyclonic attractor in the eastern Levantine basin

Barboni A.^{1,2}, Lazar A.³, Stegner A.¹, Moschos E.¹

¹ Laboratoire de Météorologie Dynamique, Ecole Polytechnique, France
² Département de Géosciences, Ecole normale supérieure de Paris, France
³ Israel Oceanographic and Limnological Research Center, Haifa, Israel

Contact : alexandre.barboni@polytechnique.edu

Data : AMEDA algorithm eddy tracking

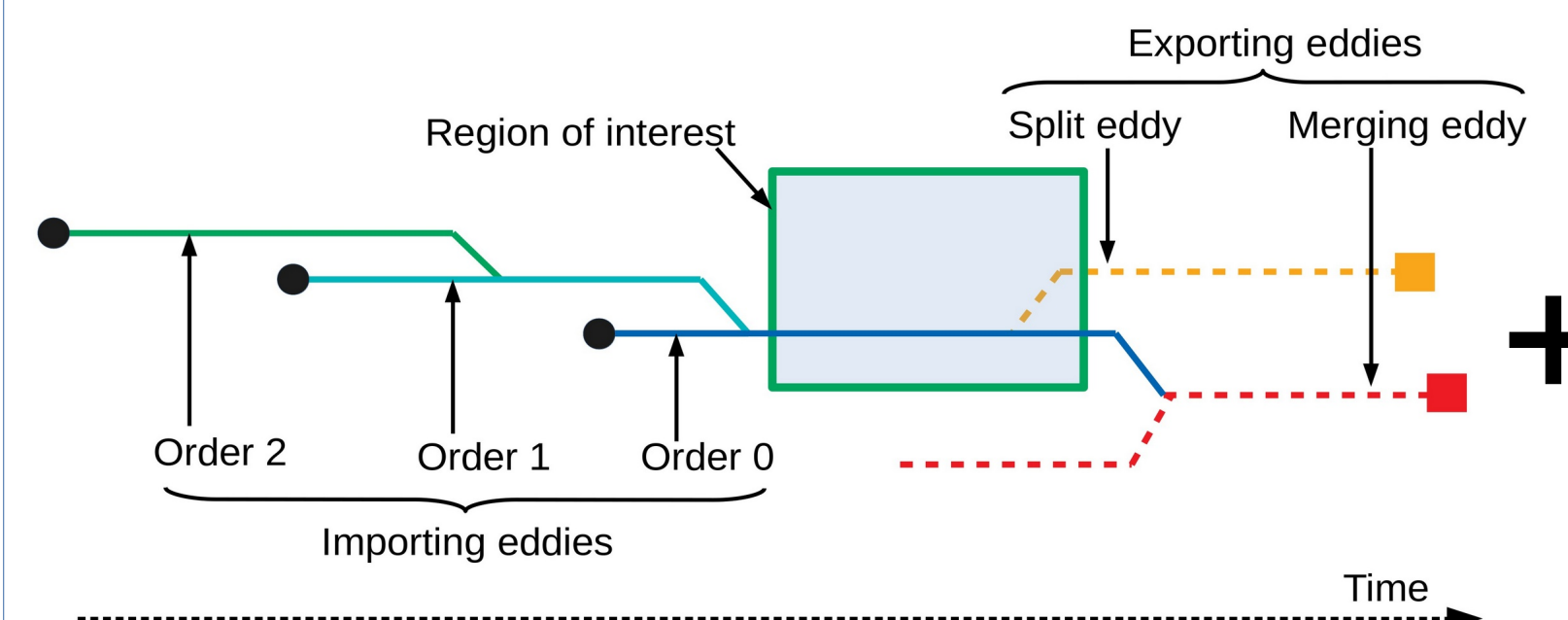


In-situ profiles



Gathered in the **Dyned atlas** : www.lmd.polytechnique.fr/dyned/

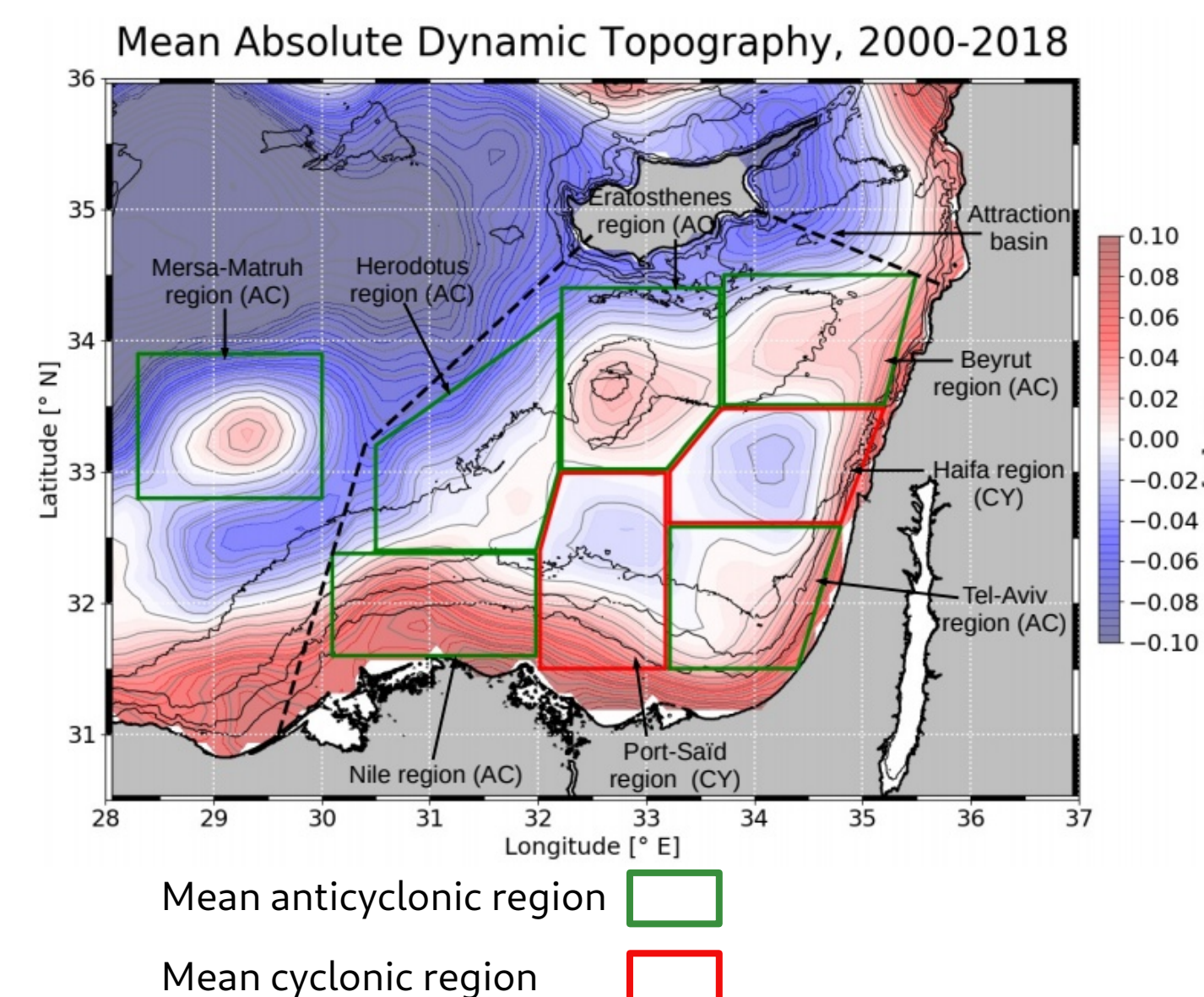
Methods : Lagrangian convergence framework



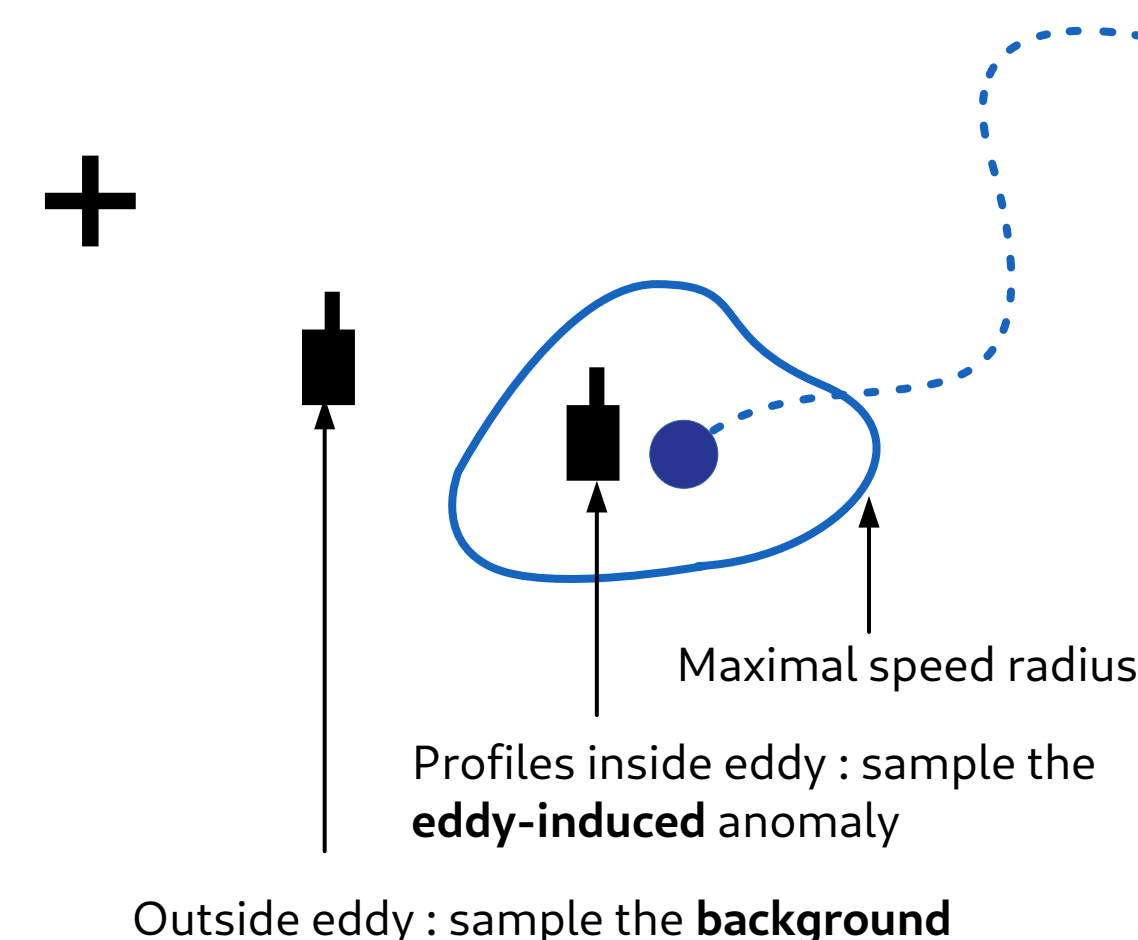
AMEDA detects mergings and splittings

→ Allows to reconstruct the **eddy network** and interactions

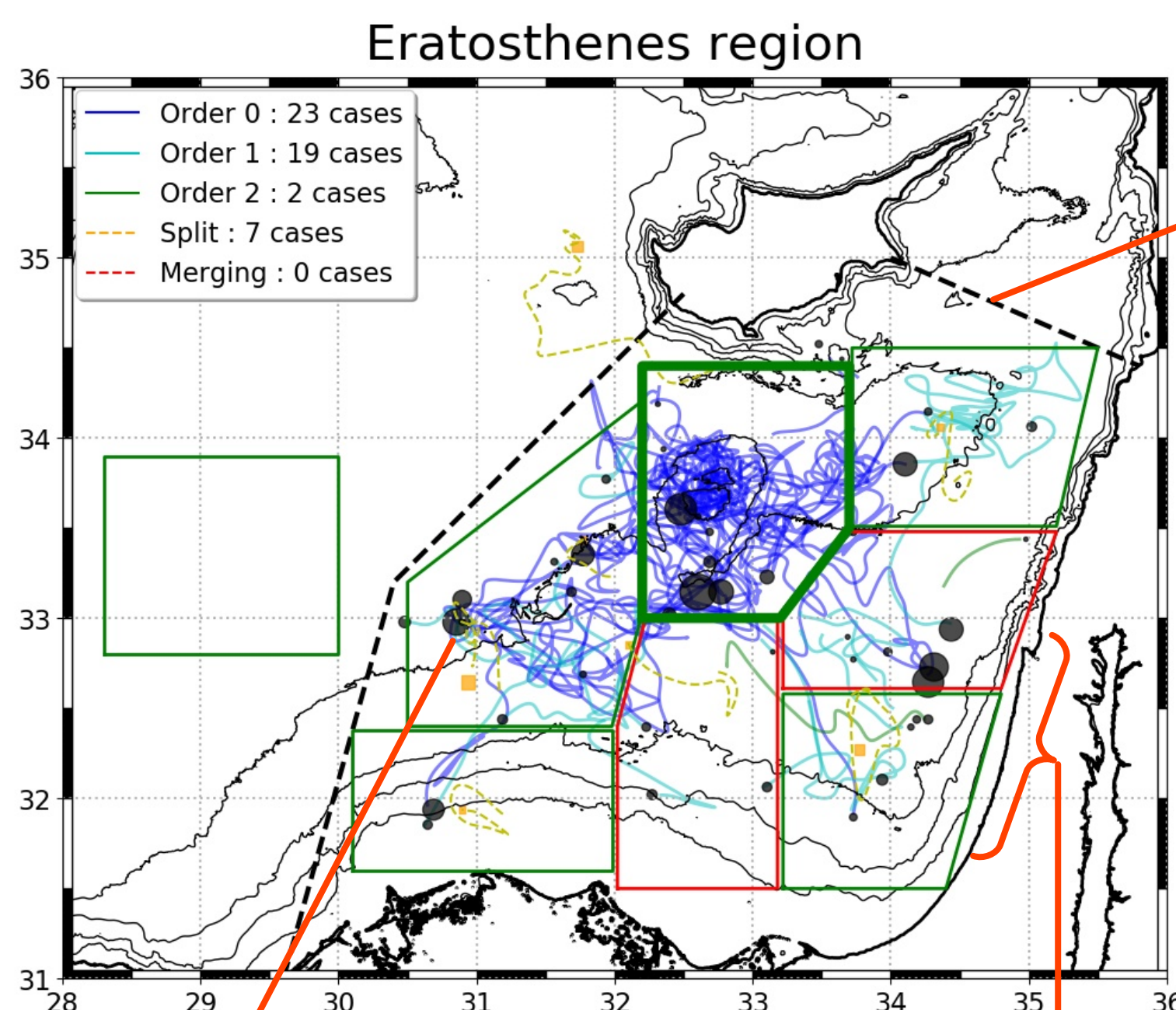
...applied to mean (anti)cyclonic regions defined in the Levantine basin



... with profiles colocalization



Result 1 : the region of the Eratosthenes seamount hosts an **anticyclonic attractor**, called EAA



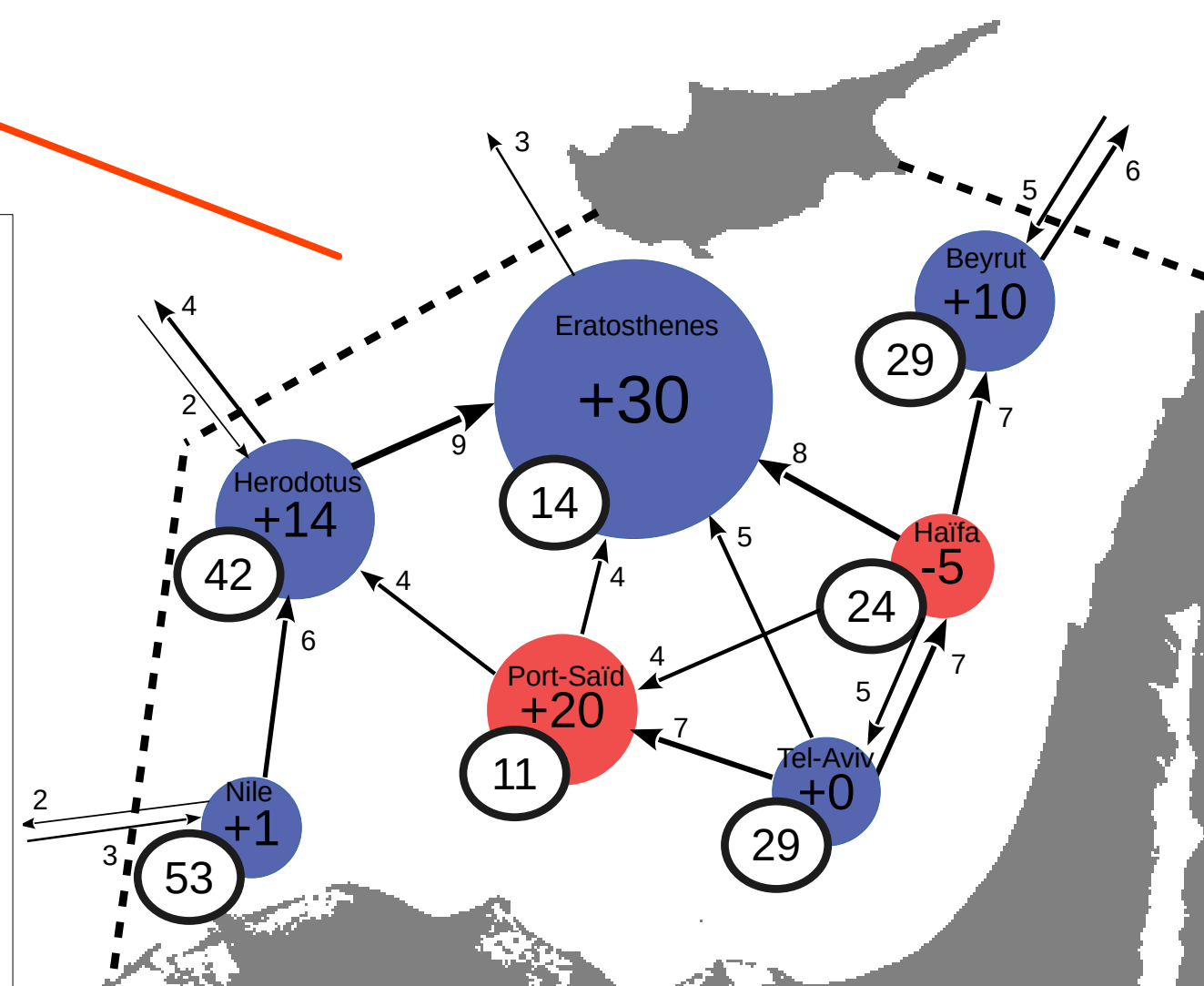
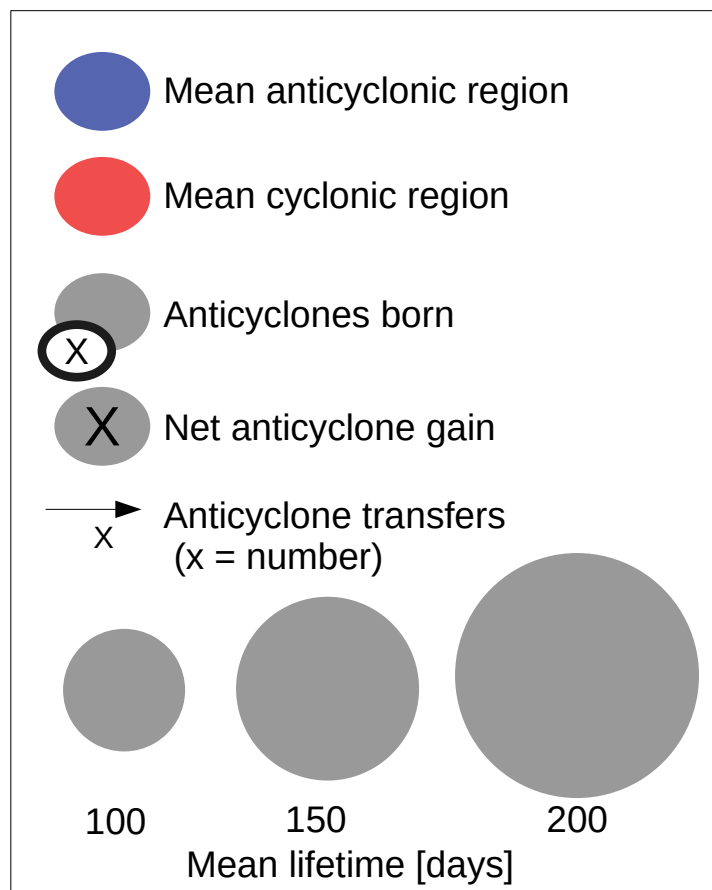
Anticyclones formed westwards near the Herodotus trench

Anticyclone detachments from the coast

Consistent with previous SST observations (Hamad et al. 2006, Gertman et al. 2010)

Result 2 : Quantification of anticyclone transfers shows that the Southeastern Levantine basin is **isolated** for anticyclones

Effective attraction basin for anticyclones

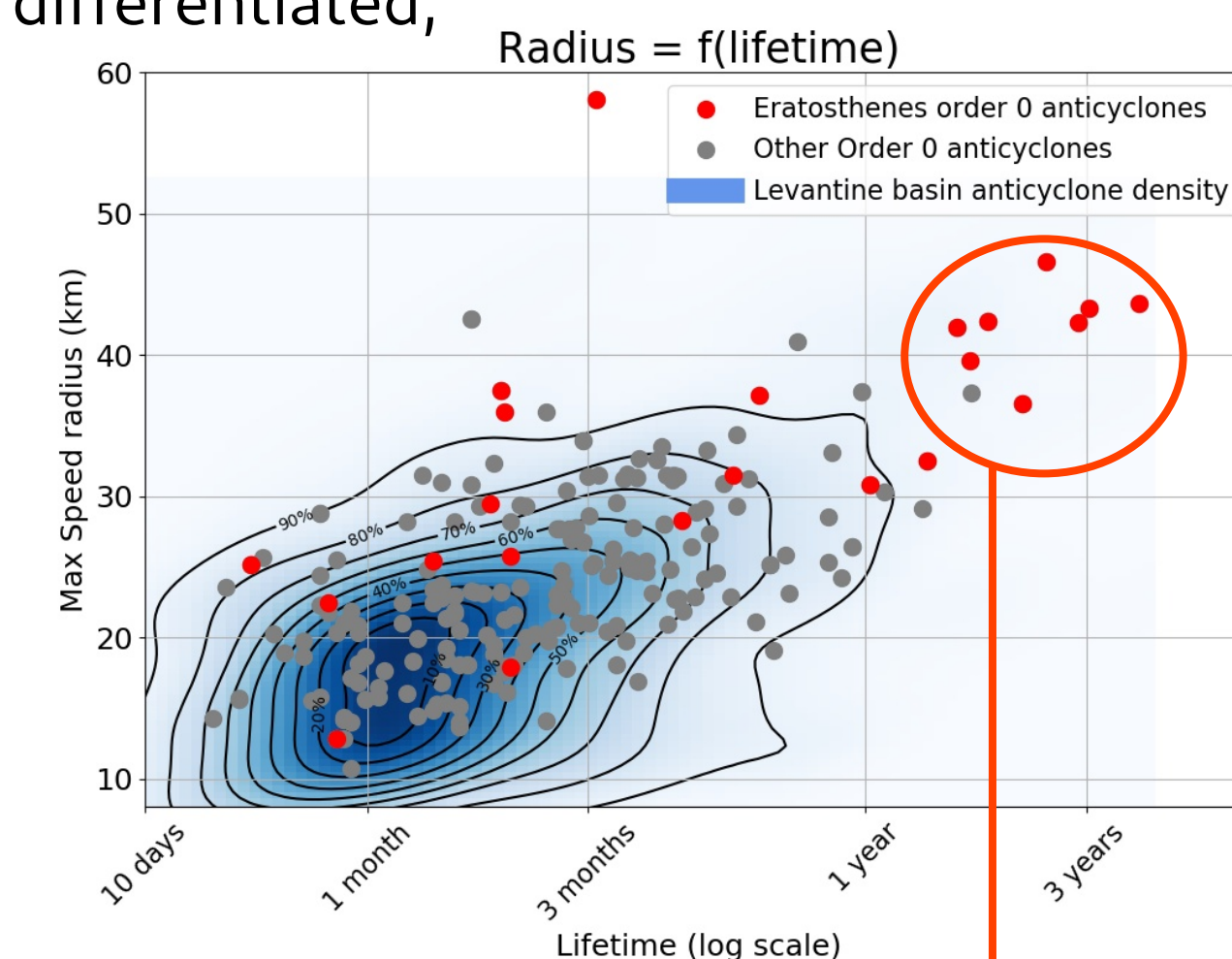
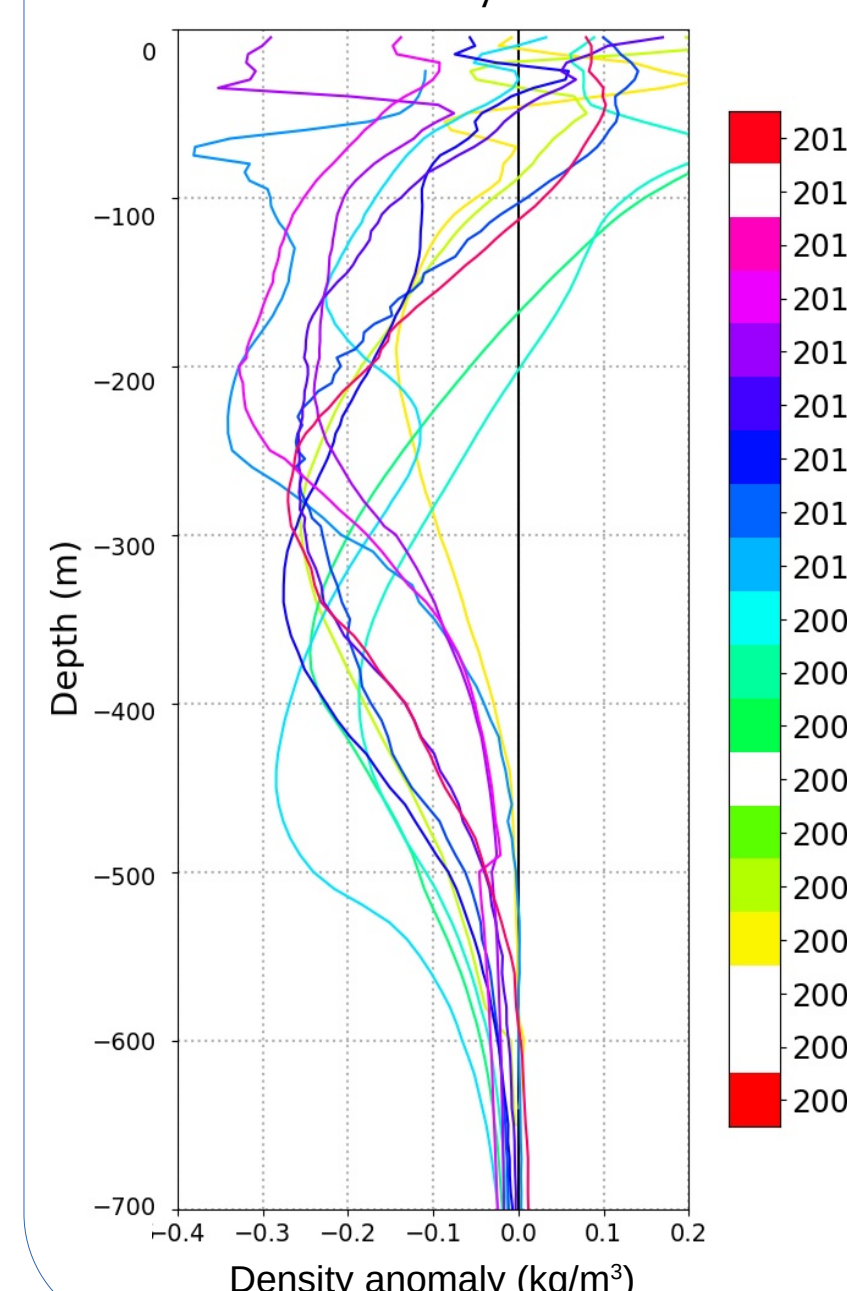


Main references for data and algorithm :

- DYNED: Stegner, A. and Le Vu, B. and Pegliasco, C. and Faugere, Y. Dynamical Eddy Atlas of the Mediterranean-Sea 2000-2018. <https://doi.org/10.14768/2019130201.2>, 2019
- Le Vu, B., Stegner, A., and Arsouze, T.: Angular Momentum Eddy Detection and tracking Algorithm (AMEDA) and its application to coastal eddy formation (2018)
- Laxenaire, R., Speich, S., Blanke, B., Chaigneau, A., Pegliasco, C., and Stegner, A.: Anticyclonic eddies connecting the western boundaries of Indian and Atlantic Oceans, Journal of Geophysical Research: Oceans, 123, 7651–7677, 2018.

Result 3 : Anticyclones get differentiated, with a **larger radius**, a **longer lifetime**

Annual average density anomaly for Eratosthenes anticyclones



Cluster of large long-lived anticyclones

→ 40 km is more than 3 times the deformation radius

... and a **deep** eddy-induced subsurface anomaly, always below 200 m